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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,651	02/04/2004	Dong-Kil Shin	9898-341	5815

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MARGER JOHNSON & McCOLLOM, P.C.
1030 S.W. Morrison Street
Portland, OR 97205

EXAMINER	
WARREN, MATTHEW E	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/772,651	SHIN ET AL.	
	Examiner	Art Unit	
	Matthew E Warren	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-16 and 20* is/are rejected.

7)☒ Claim(s) *4,5 and 17-19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6, 7, 10-16, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Hikata et al. (US 6,133,637).

In re claims 1 and 10, Hikata et al. shows (fig. 9) a multi-chip package comprising: at least two semiconductor chips (14 and 16) vertically mounted on a substrate (12a) and encapsulated with a mold resin (22); and a soft element (elastomer or epoxy resin 18) located at an interface between at least one of the at least to semiconductor chips and the mold resin, the soft element being more elastic and flexible than the mold resin (col. 5, lines 24-38). Because the soft element of Hikata is formed of the same materials and structure as the applicant's claimed invention, it is also inherently configured to reduce the constrictive force of the encapsulant on the surface.

In re claims 2 and 3, Hikata et al. shows (fig. 9) a soft element (epoxy resin 26) contacts an entire surface of the side or a portion of the side of the semiconductor chips.

In re claim 6, Hikata et al. discloses (col. 5, lines 24-28) that an adhesive is applied for adhesion between the substrate and the semiconductor chips. Because the soft element of Hikata is formed of the same materials and structure as the applicant's claimed invention, it is also inherently configured to increase vertical mobility of the semiconductor chips against a load of the adhesive applied to the semiconductor chips upon cooling.

In re claims 7 and 13, Hikata et al. discloses (col. 6, lines 24-38 and col. 6, lines 25-33) that the soft element comprises elastomer or epoxy resin.

In re claims 11 and 12, Hikata et al. shows (fig. 9) that the surface comprises the entire bottom surface of the chip (16) contained in a single plane or part of an entire upper surface of the chip (14) contained by a single plane.

In re claim 14, Hikata et al. also disclose (col. 5, lines 8-55) a method of manufacturing a multi-chip package comprising: vertically stacking at least two semiconductor chips (14 and 16) on a substrate (lead frame 12a and 12b); bonding a bond pad (14b) on at least one of the at least tow semiconductor chips to a bond finger (12b) on the substrate with a bonding wire (W); forming a soft element (26) on at least one side of at least one of the at least two chips; and encapsulating the semiconductor chips and the soft element using a mold resin (22).

In re claims 15 and 16, Hikata et al. shows (fig. 9) that the method includes forming the soft element on an entire surface of the upper chip (16) and a portion of the side of the lower chip (14).

In re claim 20, Hikata et al. discloses (col. 6, lines 24-38 and col. 6, lines 25-33) that the soft element comprises elastomer or epoxy resin.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hikata et al. (US 6,133,637) as applied to claim 1 above, and further in view of Derderian (US 6,569,709 B2).

In re claims 8 and 9, Hikata et al. show all of the elements of the claims except the solder balls as terminals for connecting the package to an external circuit and the substrate being a PCB. Derderian et al. shows (fig. 1) a package having vertically stacked semiconductor chips (30a and 30b) and a soft element formed between them. The package is a PCB (20) having solder balls (14) formed as terminals for connecting the package to an external circuit. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the package of Hikata by using solder balls as terminals as taught by Derderian to connect the package to an external circuit.

Allowable Subject Matter

Claims 4, 5, and 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Arai et al. (US Pub 2004/0051168 A1), Tan et al. (US 2003/0111720 A1), and Johnson (US 6,486,554 B2) also show package devices having stacked semiconductor chips.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MEW

December 12, 2004

Tom Thomas

TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800